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Final Technical Report

THE ENERGY DISTRIBUTION IN NOVA HERCULIS 1963

Robert C. Bless and Theodore E. Houck

We have completed the reduction to energy units of the photoelectric scanner observations of both Nova Her 1960 and Nova Her 1963. Data obtained on 13 nights between March 11 and May 13, 1960 and on 44 nights from February 22 to October 13, 1963 are now available for analysis. Most of the 1960 data consist of photoelectric spectral scans over the $\lambda\lambda 3200-6600$ region; infrared data to $\lambda 11,500$ were obtained on three nights. The 1963 data are about evenly divided between the visual and infrared spectral regions. The latter are the first observations of the spectra of novae longward of $\lambda 8500$; the approximately 20 features include the Paschen series of hydrogen, He I (especially $\lambda 10,830$) and probably [Fe II] and O I. A few lines are still of unknown origin. The 1963 data appear to be of higher quality than those of 1960 because of better weather and the proximity of α Lyrae, a "standard" star, to the nova. Even so, the 1960 results compare well with those of Meinel (Ap. J. 1963, 137, 834), where such comparisons can be made.

A computer program for reducing the large amount of data of the 1963 nova has facilitated the reduction process. The size of this task is suggested by the following: approximately 9,000 spectral features were measured and reduced. About one-quarter of these were in the continuum requiring a deflection measurement only; the rest were of spectral lines requiring the measurement of an area. Some 2,000 features were measured on the 1960 nova.

The analysis of these data to determine the physical characteristics of the nova envelope is now underway.

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13. ABSTRACT

Measurements of approximately 9000 spectral features of Nova Herculis 1963 obtained on 44 nights between February 22 and October 13, 1963 and covering the wavelength region from 3200 Å to 11,500 Å have been reduced to absolute energy units and are available for analysis. Similar reductions have been made for 2000 features of Nova Herculis 1960 between March 11 and May 13, 1960 in the region 3200 Å to 6600 Å.